

Work Order ID 60258



Page 1

Wednesday, June 30, 2010 8:53:36 AM

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 6/30/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/7/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

PK

Date: 10-6-30

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D212-664-147

Rev B

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

51010866

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

(1X)

Q

MB

10-03-03

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

(1X)

Q

MB

10-03-03

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Required Date: 7/7/2010 Req'd Qty: 1.00



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Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

130



QC

Quality Control

QC15- Crosstube Dimensional Check

0.00

Memo

0.00

6/10/08/03



140



Crosstubes

Crosstubes

Crosstubes

Memo

0.00

0.00

1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square***

2-Position cuffs on tube ensure proper positioning

3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF as per QSI 10

4-Transfer drill rivet holes from cuff into tube.

5-Identify cuff position and Batch # on each.

6- Inspect surface damage

7- Deburr and realodine cuff.

MS/AWM



0

using
J3 DT8548

AWM 10-08-04

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150



HandFXtube

Crosstubes Chemical Conversion

0.00

Memo

Hand Finishing Crosstubes

160



QC

Quality Control

QC3- Inspect Part Finish

0.00

Memo

0.00

8/10/08/09

170



QC

Quality Control

QC5- Inspect part completeness to step on W/O

0.00

Memo

0.00

8/10/08/09

AD

AWM
10-08-05

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

1. The first step in the process is to identify the problem. This involves gathering information about the situation and understanding the needs of the stakeholders involved.

2. Once the problem is identified, the next step is to develop a plan. This involves setting goals, identifying resources, and determining the steps that need to be taken to address the problem.

3. The third step is to implement the plan. This involves putting the plan into action and monitoring progress to ensure that the goals are being met.

4. Finally, the fourth step is to evaluate the results. This involves assessing the effectiveness of the plan and making adjustments as needed to improve the outcome.

Wednesday, June 30, 2010 8:53:36 AM

Accept

**Setup Start**[illegible]

Stop

[illegible][illegible]**Cust Item ID:**[illegible]

Customer:

Run Start

1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

2. Once the problem is identified, the next step is to define the objectives and goals of the project. This helps to clarify what needs to be achieved and provides a clear direction for the work.

3. The third step is to develop a plan or strategy to address the problem. This involves breaking down the problem into smaller, manageable tasks and determining the resources needed to complete them.

4. The fourth step is to implement the plan. This involves putting the strategy into action and monitoring progress to ensure that the objectives are being met.

5. The final step is to evaluate the results of the project. This involves assessing the effectiveness of the plan and identifying any areas for improvement or further action.

Stop

**Insp.
Stamp**

0.00

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

0.00

Liquid Penetrant Inspection as per QSI 038Or
Issue P/O: 12394 LPI as per ASTM 1417
Level 2 Attach copy of NDT results to work order

0.00

RESEARCH DESIGN AND METHODS

0.00

Ensure copy of NDT results attached to work order.

0.00

[illegible]

0.00

Inspect for damage & ensure results are as per Dwg D212-664-107

C2 10/8/12 ①

C2 10/8/12 ①

IT 10-08-17

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Cust Item ID:

Required Date: 7/7/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

210

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff
A/R SIKAFLEX -241/-291 BATCH: 115114RT 10-08-17

220

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: 11:00
Finish Time: 12:00

PAINT:

Start Time: 3:30
Finish Time: 4:30RT 10-08-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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Stop



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Start Date: 6/30/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/7/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230 	QC14- Inspect Spray Paint	0.00							
QC Quality Control	Memo Wrap in plastic bag to protect from scratches	0.00				<u>ML</u>	<u>10</u>	<u>08</u>	<u>24</u> ①
240 	Crosstubes	0.00							
Crosstubes Crosstubes	Memo 1- Assemble as per Dwg D212-664-147 2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe 3- Instal support with magnobond 6398 per dwg D212-664-147, cure for 12hrs before packaging. Time & date of application: <u>10-08-29</u> <u>1.00</u> Batch: <u>114158</u> EXP. DATE <u>11-08-03</u>	0.00				<u>RT</u>	<u>10.0825</u>		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

[illegible]

Wednesday, June 30, 2010 8:53:36 AM

Accept

Setup Start

00000000000000000000000000000000

Stop

██████████
██████████
██████████
██████████

Cust Item ID:

Customer:

Reference:

Run Start

Abstract—The purpose of this study was to determine if there were differences in the prevalence of musculoskeletal disorders among different types of workers. The study included 600 employees from three companies who performed different types of work. Data were collected through self-administered questionnaires. Results showed that the prevalence of musculoskeletal disorders was higher among workers performing manual labor compared to those performing non-manual labor. The results also indicated that the prevalence of musculoskeletal disorders was higher among workers performing heavy physical work compared to those performing light physical work. The findings suggest that employers should take steps to reduce the risk of musculoskeletal disorders by providing training and ergonomic interventions to workers.

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

[illegible]

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Operation Description

Set Up/ Run Hours

Tool ID**Tool #****Plan
Code**

Accept
Qty

Reject
Qty

Reject Number

**Insp.
Stamp**

QC5- Inspect part completeness to step on W/O

0.00

10/08/26

0.00

QC

Memo

Quality Control

Pick Kit

0.00

0,00

Packaging

Memo

Packaging

QC4- 100% Inspect kits for completeness

0.00

0.00

8/10/26

QC

Memo

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

Work Order ID 60258

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Wednesday, June 30, 2010 8:53:36 AM

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Low Standard Fwd

Start Date: 6/30/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 7/7/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
270		0.00							
	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D212-664-107								
280		0.00							
	QC21- Final Inspection - Work Order Release								
QC	Memo	0.00							
Quality Control									

Rev A

10/8/2010

10/08/27

MF

10-8-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Wednesday, June 30, 2010 8:53:40 AM

1. The first step in the process is to identify the problem. This involves gathering information about the situation and the people involved.

2. The second step is to analyze the problem. This involves breaking the problem down into smaller parts and identifying the causes.

3. The third step is to develop a plan. This involves deciding on the best way to solve the problem and setting goals.

4. The fourth step is to implement the plan. This involves putting the plan into action and making changes as needed.

5. The fifth step is to evaluate the results. This involves checking to see if the problem has been solved and if the goals have been met.

6. The sixth step is to reflect on the process. This involves thinking about what worked well and what could be improved.

7. The seventh step is to share the results. This involves telling others about what you have learned and how you solved the problem.

8. The eighth step is to continue to learn. This involves staying open to new ideas and ways of solving problems.




9. The ninth step is to be a good team player. This involves working well with others and helping them to solve their problems.

10. The tenth step is to be a good leader. This involves helping others to solve their problems and making sure everyone is working together.

**Required Date:** 7/7/2010

Required Qty: 1.00

Comments:	IPP Rev:A	New Issue	07.09.12	EC	verified by: JLM	
	IPP Rev:B	ECN 1100	08-01-11	DD	verified by: EC	
	IPP Rev:C	Ecn 1121	08-02-25	DD	Verified by:ec	IPP Rev:D
	10.05.27	added pick kit	DD	verf:EC		

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D212-664-107TRN 		Manufactured	No			140	Each	2.0000	1	1			
Crosstube Turning Detail													
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				LG				2					
					58588			1					
					58611			1					
D3659-1 		Manufactured	No			220	Each	9.0000	2	2			
CUFF													
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				ST477				9					
					50691			9					
CR3212-4-06 		Purchased	No			240	Each	1,441.000	44	44			
CHERRY RIVET													
				<u>Location</u>				<u>Loc Qty</u>		<u>Loc Code</u>			
				ST311				1441					
					112492			156					
					112612			285					
					112724			200					
					112794			800					

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

Picklist Print

Wednesday, June 30, 2010 8:53:40 AM

Page 2

Work Order ID: 60258

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 6/30/2010

Required Date: 7/7/2010

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

240

Each

62.9790

4

4



RUBBER CUSHION

B60983



RT 10-08-24

Location

Loc Qty

Loc Code

LG

62.97897368

53775

5.97897368

58161

12

59580

45

MS21920-25

Purchased No

240

Each

112.0000

4

4



Clamp(per MIL-DTL-8783C)

B56354



RT 10-08-24

Location

Loc Qty

Loc Code

LG

67

113281

0

114759

42

114901

25

ST451

45

113281

5

113282

18

113744

1

114141

21

D2893-1

Manufactured No

240

Each

32.0000

2

2



2.75 Support



RT 10-08-24

Location

Loc Qty

Loc Code

LG

32

53340

2

53774

10

56354

20

D3428-1

Manufactured No

260

Each

0.0000

1

1



Placard



B60484 10/8/2010

Wednesday, June 30, 2010 8:53:40 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Wednesday, June 30, 2010 8:53:40 AM

Page 3

Work Order ID: 60258

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 6/30/2010

Required Date: 7/7/2010

Start Qty: 1.00

Required Qty: 1.00

AN6-35A

Purchased

No

260

Each

34.0000

4

14

BOLT

Location

Loc Qty

Loc Code

ST343

34

113422

30

114341

4

AN6-36A

Purchased

No

260

Each

88.0000

4

4

Bolt

Location

Loc Qty

Loc Code

ST343

88

114330

38

115016

50

MS21042L6

Purchased

No

260

Each

241.0000

6

6

Nut

Location

Loc Qty

Loc Code

ST300

241

111578

41

114495

200

AN960JD616

NAS1149D0663J

Purchased

No

260

Each

0.0000

18

18

Washer

Wednesday, June 30, 2010 8:53:40 AM

Shop Packet Print

Page 3

W/O:		WORK ORDER CHANGES					
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

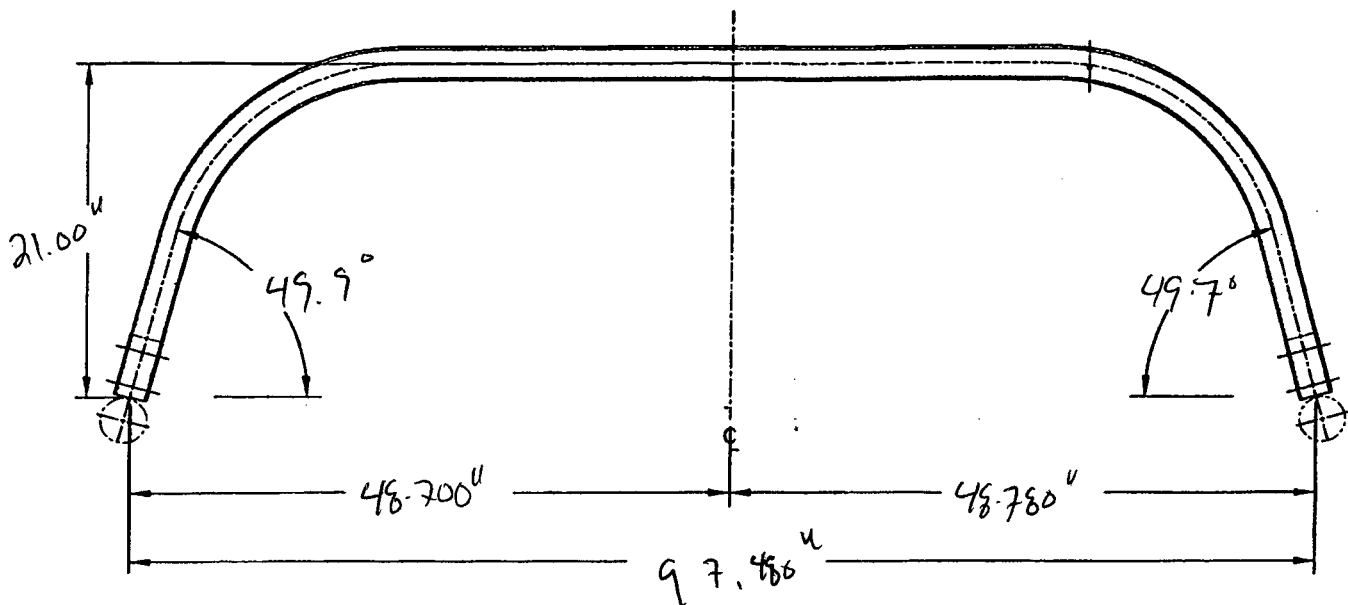
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	<i>60258</i>
Description: Crosstube Low Fwd (205/212/412)	Part Number:	D212-664-107
Inspection Dwg: D212-664-147	Rev: B	Page 1 of 1

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	<i>10/06/03</i>
Date	

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ <i>[Signature]</i>	<i>[Signature]</i>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

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Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS.
- 7) WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD
BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%
BASED ON O.D. EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE
UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS
NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

UNCONTROLLED COPY
RETURN TO
ENGINEERING
SUBJECT TO A FUTURE
WITHOUT NOTICE
WORK ORDER
NO. 60235

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF		
DRAWN	RF		
CHECKED	RF		
MFG. APPR.	RF		
APPROVED	RF		
DE APPR.	RF		
DATE	09.09.30		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. D212-664-147
SHEET 1 OF 4
TITLE CROSSTUBE (205/212/412 LOW FWD)
SCALE NTS

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RELEASED
2009-10-29

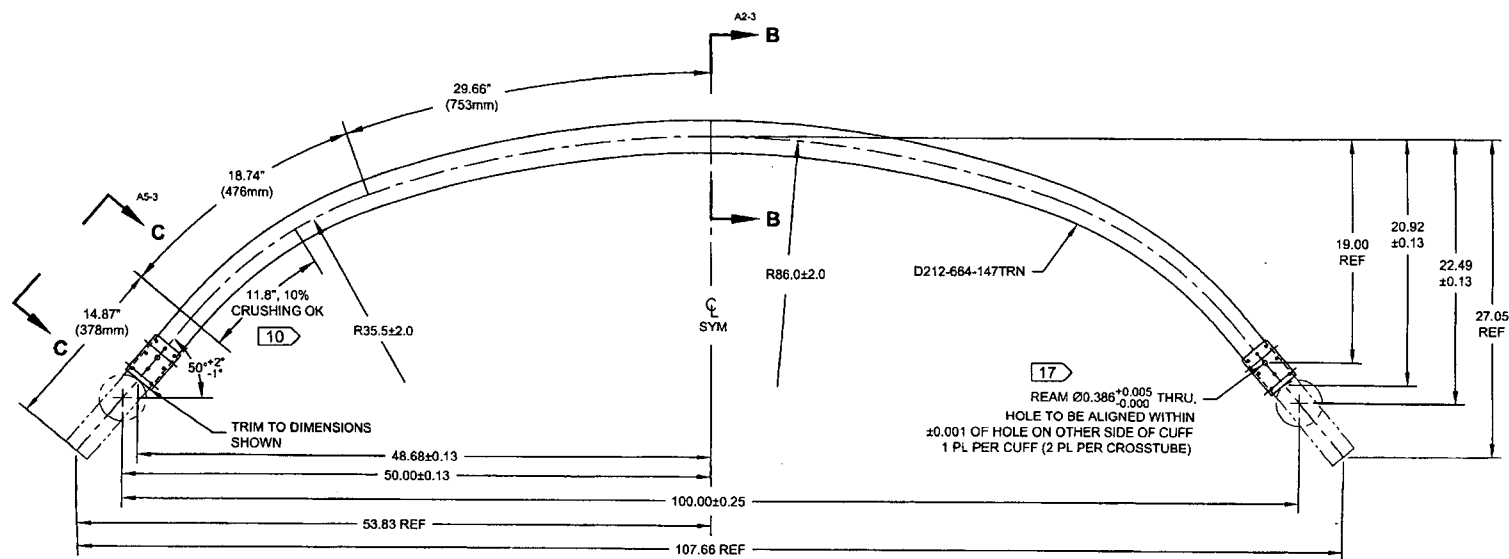
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

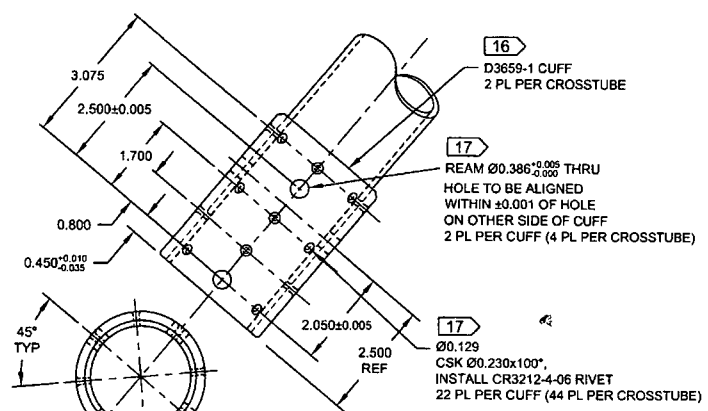
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

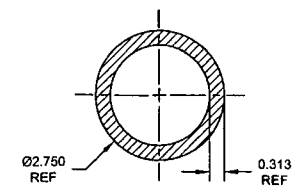


D212-664-507
BENDING AND DRILLING DETAIL 10 B

WLB 66258



VIEW C-C: CUFF DETAIL D7-3
 SCALE 4X



SECTION B-B D5-3
 SCALE 4X

RELEASED
 2009-10-29

DESIGN	92	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	92	DRAWING NO.	REV. B
MFG. APPR.	15	D212-664-147	SHEET 3 OF 4
APPROVED	19	TITLE	SCALE
DE APPR.	19	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD <small>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

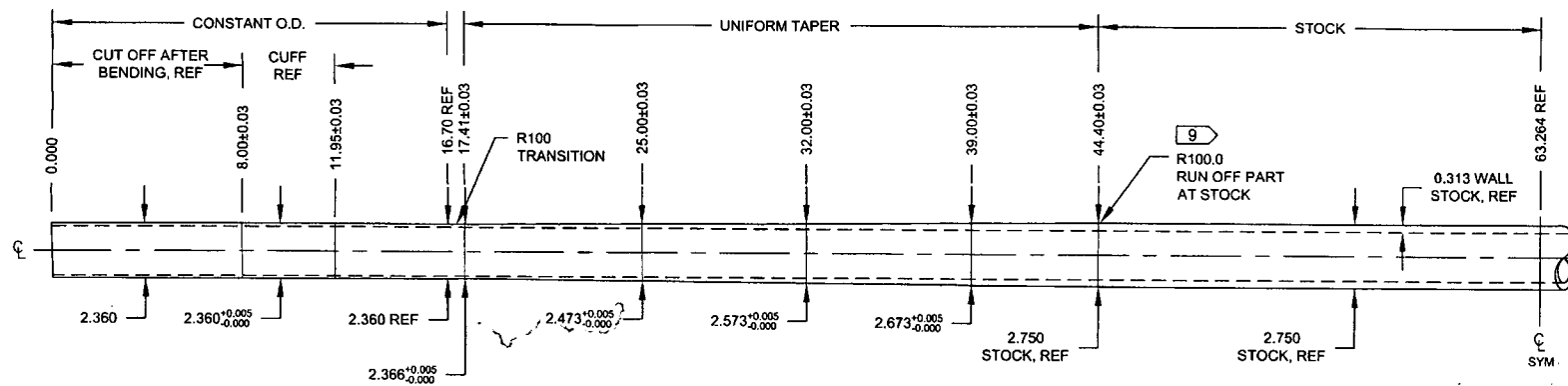
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D212-664-147TRN
TURNING DETAIL

w/660258

RELEASED
2009-10-29

DESIGN	RF	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. B
MFG. APPR.	RF	D212-664-147	SHEET 4 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE (205/212/412 LOW FWD) NTS	
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD	
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Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____
 Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

5.2 STANDARD GEAR CROSSTUBES

Item	-107	-207	-209	Part Number	Description
	X			D212-664-107	CROSSTUBE INSTALLATION, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
		X		D212-664-207	CROSSTUBE INSTALLATION, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
			X	D412-664-209	CROSSTUBE INSTALLATION, 412 STANDARD AFT
6	1			D212-664-147	CROSSTUBE ASSEMBLY, 204/205/210/212/214/412, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD FWD
7		1		D212-664-247	CROSSTUBE ASSEMBLY, 204/205/210/212/214, UH-1H, UH-1A/B/E/F/L/P, TH-1F/L, HH-1K STANDARD AFT
8			1	D412-664-249	CROSSTUBE ASSEMBLY, 412 STANDARD AFT
10	2			* D2893-1	SUPPORT
11	4			* D3595-063-450	RUBBER CUSHION
12	4			* MS21920-25	CLAMP (OR MS21042-26)
13	4			AN6-35A	BOLT
14	4			AN6-36A	BOLT
15	6			MS21042L6	NUT (OR MS21042-6)
16	18			AN960JD616	WASHER
20		2		* D2940-1	SUPPORT
21		4		* D3595-063-530	RUBBER CUSHION
22		4		* MS21920-28	CLAMP (OR MS21042-30)
23		4		AN6-40A	BOLT
24		2		AN6-41A	BOLT
25		6		MS21042L6	NUT (OR MS21042-6)
26		18		AN960JD616	WASHER
30			1	* D2896-1	SUPPORT
31			2	* D2856-600-1009	ABRASION STRIP
32			2	* D3595-063-570	RUBBER CUSHION
33			4	* MS21920-28	CLAMP
34			2	* MS21920-30	CLAMP (OR MS21042-32)
35			4	AN6-40A	BOLT
36			2	AN6-41A	BOLT
37			6	MS21042L6	NUT (OR MS21042-6)
38			18	AN960JD616	WASHER
39			2	* D3189-1	CHAFING SHIELD
45	2			* D3659-1	CUFF
46		2	2	* D3660-1	CUFF
47	44	44		* CR3212-4-06	RIVET (M7885/3-4-06)
48			44	* CR3212-4-07	RIVET (M7885/3-4-07)
50	1	1		D3428-1	PLACARD

*REFERENCE ONLY. PARTS ARE INCLUDED IN D212-664-147/-247 OR D412-664-249 ASSEMBLIES ABOVE
 NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AA
 SKIDTUBES.

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Revision: F

Date: 08.09.05



ACUREN

LIQUID PENETRANT TEST REPORT

P- 05489

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

POWO NO.

WORK LOCATION

ACCEPTANCE STD.

PAGE

OF

TIME

AM

PM

REV./DATE

DART AEROSPACE
LINDA LACELLE / CHANTINE / JIAN
1270, ABERDEEN
HAWKESBURY ON

AUG 13/2010
138-10-0795

AS ADDRESS

ASTM E1417 / 431-03B REV./DATE 2008

W.F.P.T. ON 6 X CROSS TUBES

SEE W.O.# BELOW IN RESULTS

JOB DESCRIPTION

PROCEDURE NO. LT-002 REV./DATE 2008

TECHNIQUE NO. LT-002 REV./DATE 2008

PART NO.

MATERIAL ALUMINUM THICKNESS N/A

SCOPE

Performed a Wet Fluorescent Liquid Penetrant Inspection on 100% of
THE EXTERNAL SURFACE

TEST DETAILS

METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED
FAMILY BRAND	MAGNA FLUX		BLACK LIGHT S/N	13798	<input type="checkbox"/> OUTPUT > 1000 μ W/cm ²
ENETRANT	ZL-67	MINIMUM DWELL TIME	10	MIN.	<input type="checkbox"/> AMBIENT < 2 fc
ENETRANT REMOVER	H2O	MINIMUM DRY TIME	>10	MIN.	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
DEVELOPER	SKD-52	MINIMUM DWELL TIME	10	MIN.	OTHER
DEVELOPER TYPE	<input type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY		LIGHT METER S/N
					CAL DUE DATE 12/16/2010

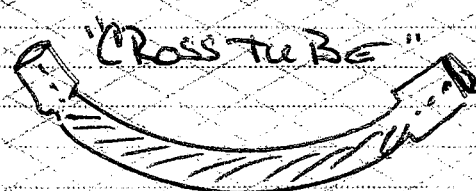
TEST SURFACE

SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input checked="" type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/50°F	<input checked="" type="checkbox"/> 10°C/50°F TO 52°C/125°F	<input type="checkbox"/> > 52°C/125°F	

RESULTS-

☐ METRIC ☒ IMPERIAL

ITEM	COMMENTS	ACCEPT	REJECT	ITEM ID: - D407-667-25 (ITEM# 1 & 2)
1	CROSS TUBE - W.O. ID 59887	✓	X	ITEM ID: - D212-664-101 (ITEM# 3 & 4)
2	CROSS TUBE - W.O. ID 59888	✓		ITEM ID: - D212-664-107 (ITEM# 5 & 6)
3	CROSS TUBE - W.O. ID 61074	✓		
4	CROSS TUBE - W.O. ID 61075	✓		
5	CROSS TUBE - W.O. ID 60258	✓		
6	CROSS TUBE - W.O. ID 60259	✓		



IT 10-08-17

Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as presentations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the results or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

Ben Titley
PRINT

[Signature]
SIGNATURE

DTR# E48667

REPORT

REVIEWED BY:

NAME

INITIALS

1ST TECHNICIAN2ND TECHNICIAN

CGSB LEVEL

SNT LEVEL

CGSB LEVEL

SNT LEVEL

CGSB Reg. No

CGSB Reg. No

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT-8